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The Bile in Its Relation to Infection and Intoxication.

A. C. ABBOTT, M.D.

The facts that are known with regard to the relation of bile to intestinal fermentation, to general infections, and to intoxications are few in number and not very satisfactory. The results of such investigations as have been made on the subject may be briefly summarized as follows:

Outside the living body the bile, as a whole, is possessed of no germicidal and of but doubtful antiseptic properties.

For a single intoxicant both the bile, as a whole, and certain extracts made from it have been shown to possess antitoxic properties.

During the course of a single specific infection the bile has been shown to possess the property of protecting animals, into which it is injected, against the disease from which the animal supplying it is suffering.

In a few forms of infection (two at least) the micro-organisms causing the disease sometimes persist in the bile in a living condition for a long time after their disappearance from the other organs and tissues of the body.

Let us now consider briefly some, at least, of the reasons for these conclusions.

It is customary to regard antiseptics as one of the functions of the bile in the normal animal body. This opinion seems to have no basis in experimental evidence, but is referable to the common observation that the intestinal contents of persons suffering from diseases in which the flow of bile is suppressed have, contrary to that which is normally the case, a distinctly putrefactive odor; consequently, the absence of such odor from the intestinal contents when the flow of the bile is uninterrupted has led to the conclusion that a function of the bile is to prevent putrefaction. We must not lose sight of the fact, however, that this secretion possesses another important function, notably that of exciting peristalsis, and it is equally logical to believe, as has been frequently suggested, that the absence of putrefaction under normal conditions is due less to antiseptic peculiarities exhibited by the bile than to its influence in hastening the discharge of decomposable matters from the intestinal canal before putrefaction has time to set in.

The experiments that have been made upon the bile as a whole, for the purpose of deciding its influence upon the growth of living micro-organisms, have, in the majority of cases, shown it to be devoid of this property to any high degree. It does not prevent decomposition and putrefaction, nor does it prevent the development of pure cultures of bacteria that are exposed to its influence.

Indeed, it is a common experience that freshly drawn bile readily undergoes decomposition, although this is not always the case, for it is possible, occasionally, to obtain bile under such precautions as to prevent this change. In this connection an interesting and important observation is recorded by Copman and Winston, who succeeded in obtaining bile that did not decompose, but in which they were able, through bacteriological methods, to demonstrate the presence of living bacteria. These observers likewise record a series of experiments in which an effort was made to determine if the bile possessed antiseptic properties when drawn from the body. Their results demonstrate that under the conditions of their experiments little or no restraining power could be detected; but I am forced to the conclusion that their methods of experimentation were not beyond criticism, and on this point I shall speak somewhat at length later.



Maly and Emich employed in their frequently quoted investigations the bile acids rather than the bile as a whole, for the reason that they regard the bile acids as existing free, for a time at least, in the intestinal canal. In these experiments it was demonstrated that of the bile acids the taurocholic was possessed of a high degree of antiseptic power, preventing putrefaction of meat infusion in the proportions of from 0.5 to 1 per cent., and on the strength of this observation it has been suggested that such antiseptic activity as the bile may possess in the intestinal canal might be ascribed to the action of this biliary constituent, which is more or less constantly liberated from the base with which it is combined in the bile, not only at the upper part of the intestinal canal, through the action of the acid contents of the stomach, but further down by the acids resulting from carbohydrate fermentation.

With regard to the antitoxic properties of bile, it is hardly necessary to do more than mention the important investigations of Frazer, now doubtless familiar to you all, in which it was shown that both the bile as a whole and certain extracts from it had not only the property of neutralizing the poison of certain venomous reptiles, but also the power of protecting, to some extent, animals into which it was injected from subsequent intoxication with those poisons. These observations are not alone of very great value in connection with the peculiar form of intoxication upon which they were made; but they suggest the possibility of analogous antagonisms between the bile and other specific poisons that are accountable for various constitutional conditions.

Bearing upon the rôle of the bile in specific infectious processes, the most interesting observations that we have are those of Koch, made during his study of rinderpest. Koch found that if the bile of an animal sick of this disease be collected on about the fourth or fifth day of the acute stage of the disease, that this bile when injected into a healthy susceptible animal protected that animal against subsequent fatal infection, notwithstanding the fact that there is every reason for believing that the specific micro-organism causing this malady was at the same time present in the bile injected. Two views have been advanced in explanation of this interesting phenomenon. The one is that the micro-organisms present in the bile were so attenuated that they were no longer

capable of producing in the animal into which the bile was injected anything more than a mild, non-fatal form of the infection. The other view is that recently advanced by Kolle, in the last number of the *Zeitschrift für Hygiene*. Without entering into the details of Kolle's investigations, it will suffice to say that he has shown that there is probably no attenuation whatever of the micro-organisms contained in this bile, and that the immunity conferred through the inoculation of animals with it must be explained in another way. He suggests that, in all probability, the protection thus afforded to animals is due to the growth of these specific micro-organisms at the point at which they are deposited under the skin, and that their dissemination from this point is prevented by the action of the bile on the surrounding connective tissue. He thinks it likely that this action is to isolate the micro-organisms or to surround them by altered tissues through which they cannot penetrate and disseminate into the tissues. In other words, he does not regard the protection thus afforded as due strictly to the transference of a soluble poison, but rather to the introduction of micro-organisms that generate a soluble poison, but whose activity is confined to the spot at which they are deposited. In other words, the immunity thus afforded is, according to Ehrlich's conception, active (as in vaccination against anthrax, for instance) and not passive, as in the case of immunity conferred against diphtheria through the use of diphtheria antitoxin, and against tetanus with tetanus antitoxin, etc.

Whether the bile is normally possessed of antiseptic properties or not, we know that in the course of certain infective processes this function is apparently lost. It is not uncommon to detect in the bile, long after the acute stages of infection by both the typhoid and the colon bacillus, the bacteria causing these diseases, and in the experimental forms of these infections, particularly with the colon bacillus, it is common to find this micro-organism in the bile of rabbits long after they have disappeared from the other organs. Such observations naturally suggest the possibility of alterations in the bile during the course of diseases that have robbed it of its normal properties; but just what these alterations are, and to what extent they are accountable for the conditions named, it is not possible, in the present state of our knowledge, to say.

From this brief and probably imperfect review of the subject, it is evident that our knowledge of the bile in its relation to infections and intoxications is very limited. It is my opinion that the unsatisfactory state of our knowledge on this subject is in part due to the false stand-point from which the bile has been studied. So far as I have been able to gather, investigators have regarded this secretion as inert, and in their experiments have treated it as a dead substance, losing sight entirely of the possibilities of its possessing vital properties. Had the circulating blood been studied from the same stand-point as has the bile, we should never have been possessed of the interesting knowledge that we now have with regard to its important vital function as a germicide. In the majority of cases in which bile has been studied it has been drawn from the animal body without due precautions as to asepsis, has in most instances been added to culture media, and then sterilized by heat, and in other ways has been entirely robbed of any vital property that it may have possessed in the body. In view of this I am of the opinion that if the bile be studied in much the same way that the living circulating blood has been studied, that we shall find it to be possessed of peculiarities very different from those that it exhibits when it is treated as a dead, inert substance.

DISCUSSION.

DR. ARNOLD: Dr. Abbott's paper is of special interest to me in view of some work I undertook, some months ago, on the antagonism between the bile and the vegetable alkaloids. After the publication of Fraser's work on *Bile and Snake Venom*, and because of the well-known fact that the alkaloids act much more vigorously when given subcutaneously than when administered by the mouth, it occurred to me that possibly the bile in some way antagonized their action.

I took a series of frogs and injected them with varying doses of strychnine; recorded the onset of convulsions, their severity, duration, and time in which death occurred. Another series of similar frogs were injected with the same doses of strychnine mixed with fresh frog's bile. A third series were injected with similar doses of strychnine mixed with ox-bile, and a fourth with

bile alone. The frogs given the strychnine mixed with bile survived doses of strychnine which were surely fatal when given alone. The onset of symptoms was later, and they were less severe. The fresh frog's bile was more active than the ox-bile. None of the frogs died after the injection with bile alone. The bile was excreted rapidly in the urine.

Finally, strychnine was mixed with fresh frog's bile and allowed to stand for three hours. At the end of this period I failed to find strychnine by the ordinary chemical test. I have not completed the study, but it seems to promise interesting developments.

April 13, 1899.

Acetosoluble Albumin in the Urine. A Brief Review of the Literature on the Subject and a Report of Two Cases.

W. M. L. COPLIN, M.D.

(From the Laboratories of the Jefferson Medical College Hospital.)

In 1889, Pattien¹ called attention to the occasional presence in the urine of a form of albumin precipitated by boiling in the absence of acetic acid, but undergoing re-solution upon the addition of acetic acid; or if rendered ever so faintly acid by acetic acid, the albumin would not be thrown down upon boiling.

He attempted to artificially produce this form of albumin from the albumin of blood-serum, and also from egg-albumin. Later² Pattien reported the results of his experiments, and believed that it was possible by slight changes in the reaction of the medium, by the action of certain sodium salts, by processes of filtration, and by evaporation, to convert serum-albumin, in part at least, into acetosoluble albumin.

For this reason he believes that the acetosoluble albumin is but a modified form of serum-albumin, and that the modification takes place in the conducting portion of the urinary apparatus. He is of the opinion that the albumin enters the urine at the level of the glomerulus as serum-albumin and is altered in its descent through the tubes of the kidney under the influence of some secretion of the epithelial cells or by some special change in the reaction of the medium in which the albumin is being carried.

Combemale and Desoill³ briefly review the work of Pattien and give the reported cases, adding thereto a case of their own. Of the cases collected by these authors the first⁴ in their collection is that of an eclamptic, aged twenty-one years. The urine contained from 33 to 40 grammes of albumin per litre, determined by the trichloracetic method; the urine remained clear if rendered acid by acetic acid and boiled, or if boiled, the precipitate formed would be redissolved by acetic acid. In the course of time the albumin diminished to 2 grammes per litre and later took on the reaction of ordinary serum-albumin.

The second case closely resembled the first, the patient being an eclamptic, the urine containing not only the acetosoluble albumin but a small quantity of albumin which reacted in the usual way. As the authors remark, this evidenced a mixture of serum-albumin and acetosoluble albumin.

The third case was a parturient who did not have eclampsia, but who eliminated a large quantity of albumin; a few days before confinement and also on the day of confinement, the serum-albumin was replaced by acetosoluble albumin.

A case is reported⁵ in which a man, aged thirty-eight years, excreting 500 grammes of urine containing 15 grammes of albumin in the twenty-four hours, was placed on a rigid milk-diet, when the quantity of albumin quickly was reduced to 2 grammes in the twenty-four hours, and changed from the usual form of serum-albumin to the acetosoluble albumin. Later the albumin changed back to serum-albumin, sometimes giving one reaction and sometimes the other.

To these previously reported cases, Combemale and Desoill add an unpublished case, giving in detail the results of the urinary examination. The patient was a male, thirty-nine years of age, an alcoholic with symptoms of interstitial nephritis, hypertrophy of the heart, very slight oedema, shortness of breath, etc. The quantity of urine varied from 1200 c.c. to 2 or 3 litres, specific gravity between 1004 and 1010, with a small quantity of chlorides and urea, and an abundance of phosphates, the latter probably due to the exclusive milk diet. The clinical symptoms were undeniably those of renal lesion; the sediment contained hyalin and fatty casts. On boiling there was an abundant grumous precipitate,

which dissolved in acetic acid or nitric acid. The solubility in acetic acid was complete, whether acid be added before the formation of the precipitate or afterward. The presence of albumin could be abundantly demonstrated by the reagent of Tanret or by Esbach's test, by potassium ferrocyanide and the acetic acid test, or if precipitated by trichloracetic acid and heat the quantity of albumin could be estimated to be 2.5 to 3 grammes per litre.

To the foregoing collection of cases I wish to add the following:

CASE I.⁶—Mrs. A. B., seven months advanced in her second pregnancy, gradually developed symptoms of an atypic typhoid which later became typical. Early in the second week of her illness the urine was brought to the laboratories of the Jefferson Medical College Hospital for examination. It had been carefully examined and albumin had been demonstrated a few days previously, but not in the specimen submitted. The specific gravity was 1022; color high; there was slight sediment, and the acetic acid and nitric overlying tests and nitric-magnesian tests were negative. With regard to the nitric-magnesian test there was some doubt, but certainly there was not sufficient reaction to enable one to say positively that the case was one of albuminuria. The ferrocyanide and the acetic acid tests were fully satisfactory, and the reaction clearly that of albumin. Microscopic examination showed the presence of a few granular bodies which were regarded as casts. The trichloracetic acid test was not made, nor was the reagent of Tanret tried. The biuret test was not satisfactory. This was attributed to the fact that the solutions were in an unsatisfactory condition, and expecting to make later detailed repetition of the test with fresh solutions, the examination at that time was not made as it should have been. For some reason or other samples were not delivered to the laboratory for some days, and when the second sample was examined we failed to find either albumin or casts. Repeated estimation of the quantity of urea showed a slight reduction, never, however, sufficient to deserve special consideration.

This patient is still under observation and the urine is being watched for the reappearance of the usual serum-albumin or acetosoluble albumin, neither of which has been found at any recent examination,

CASE II.⁷—Stout, plethoric child, aged ten years, suffering with mild attack of tonsillitis. Temperature had been stationary for about three days at 103° . There was follicular distention with some ulceration of tonsils, followed by necrosis and exfoliation of considerable portion of the mucosa. Thinking that the case might be diphtheria, antitoxin was administered on the second day. A most careful bacteriological examination was made, revealing the presence of staphylococci, aureus and albus, and the pneumococcus, but no diphtheria bacilli. The urinary examinations were conducted in the laboratory of the Jefferson Medical College Hospital. Before the administration of the antitoxin a trace of albumin was demonstrable by the acetic acid and boiling test, and also by the nitric overlying test. On the day following the administration of the antitoxin the temperature fell, the throat condition greatly improved, and from this time convalescence was uninterrupted. An examination of urine on the day following the administration of the antitoxin showed the absence of albumin by tests which had been utilized to demonstrate it previously, and acetosoluble albumin had replaced the serum-albumen. This was slight in quantity, consisting of but little more than a positive trace. It continued present for seventy-two hours in diminishing quantities, and finally disappeared. Now, after a relapse of nearly two weeks, it is no longer demonstrable.

From the foregoing cases and from a superficial study of the literature it is apparent that the boiling and acetic acid and nitric acid tests are not to be depended upon in all cases. In this form of albuminuria, and it may be in any form of albuminuria, we have occasionally, or it may be constantly, present in the urine a form of albumin soluble in acetic acid. This form of albumin is precipitated by Tanret's reagent, by Esbach's reagent, trichloroacetic acid, and by potassium ferrocyanide. Our growing knowledge of the albumin present in the urine tends more and more to show the unreliability of any single test as a constant index to the presence or absence of albumin.

The presence of acetosoluble albumin in health has not been demonstrated. The fact that a large percentage of patients in whose urine it has been demonstrated are pregnant women may show there is an intimate connection between pregnancy and the

presence in urine of this particular form of albumin. Again, failure to detect albumin in certain cases of eclampsia may be due to this routine use of reagents which fail to react in the presence of this morbid product.

REFERENCES.—(1) *Comptes-rendus Acad. des Sciences*, 1889. (2) *Bulletins de la Société de Biologie*, March, 1891. (3) *Archives Provinciales de Médecine*, Tome i., No. 2, February, 1899. (4) *Soc. de Biologie*, December 10, 1897. (5) *Soc. de Biologie*, December 18, 1897. (6) I am indebted to Professor Hare and Dr. Holder for the privilege of reporting this case. (7) I am indebted to Professor Graham for notes of this case.

April 13, 1899.

Myo-fibrosarcoma of the Ovary.

J. D. STEELE, M.D.

(From the Clinical Laboratory of the Presbyterian Hospital.)

The case from which the specimen was obtained was admitted to the medical wards of the hospital in October, 1898. She was under the care of Dr. Stryker, Dr. Woods, and Dr. Musser successively. The case history is as follows: Mrs. L. D., aged fifty-six years, white. Her family history shows nothing. Beyond an attack of erysipelas at sixteen years of age, she has been well and strong up to her fatal illness. Ten years before admission she passed the menopause without trouble. About six weeks before entering the hospital she fell from a carriage, alighting upon her back and injuring her right arm. She began to suffer immediately from pain in her abdomen and some diarrhoea. Two weeks afterward her abdomen began to swell, and she had pain and tenderness in her epigastrium. These symptoms grew worse over a period of four weeks, when she was admitted.

Her physical examination at that time showed nothing of interest, except in the abdomen. This was tightly distended and the epigastrium full. There was dulness in the flanks, which bulged, and there was distinct fluctuation. No mass could be detected, but there was considerable tenderness upon the right side anteriorly. Soon after this the patient's abdomen was tapped and fluid withdrawn. Soon afterward she began to complain of a sensation as if "something was alive inside of her." There was no pain.

Now examination showed a firm, elongated mass in the left iliac region, running toward the symphysis in the direction of the fibres of the external oblique. It was about 5 or 6 inches long, and slipped away from the fingers as if floating about in the peritoneal cavity. At times there appeared to be pulsation in the growth, probably transmitted. There was considerable diarrhœa. The urine ranged from 1020 to 1030, acid, contained no albumin or sugar, but some crystals of oxalate of lime and some red blood-cells.

Upon January 5th the abdomen was again tapped and 132 ounces of fluid were withdrawn. The fluid had a specific gravity of 1020, and contained a great deal of albumin (one-fourth by volume upon boiling). After tapping the mass could be plainly felt in the hypogastric region; it was freely movable and seemed somewhat larger than before.

Upon February 3d the white blood-cells numbered 4700 per cubic millimetre.

Upon February 9th she was transferred to the surgical wards under the care of Dr. Wharton, to whose courtesy I am indebted for the privilege of reporting the case. Dr. Wharton operated upon February 9th, and removed a large tumor which appeared to spring from the left ovary. The patient did very well at first, but in about a week began to sink, and died upon February 21, 1899.

The autopsy was performed by Dr. Hughes, and showed distention of the intestines with some peritonitis and fibrinous exudate. The retroperitoneal lymph glands were enlarged and soft. The ligature of the operation was intact, and there was some blood in the peritoneal cavity, especially in the pelvis. The myocardium, kidneys, and liver were pale. The gall-bladder was shrunken and filled completely by a large gallstone. There was nothing else of interest.

The tumor was distinctly encapsulated, and measured 14 cm. in its long diam., 9 cm. in its short diam., and 56 cm. in its greatest circumference. It is uniformly hard and shows no areas of degeneration. In color it is a light pink, transversed by bands of whitish tissue dividing it up into alveolar-like spaces, and causing it to resemble, in some respects, a myofibroma. At one end of the tumor is a nodular growth 6.5 cm. in diameter, and projecting 3

cm. above the general level of the tumor surface. Numerous bloodvessels are seen running over the surface of the mass, but the number of bloodvessels seen on the surface of the cut section is small.

Blocks were taken from the nodule mentioned and from various portions of the tumor, embedded in celloidin, cut and stained with hæmatoxylin and eosin. The findings in the sections from all portions of the mass are practically the same. There appear to be three sorts of tissue present: 1. A large amount of fibrous connective-tissue running in thick bundles in all directions, dividing the section up into aveoli of irregular shapes. This tissue shows the characteristic spindle-shaped cells. 2. Mingled with the fibrous tissue in some places, in others running in bundles by itself, and in others still, seen scattered through the sarcoma tissue proper, are elongated cells with distinctly rod-shaped nuclei, and which, I think, must be unstriped muscle fibres. 3. Lying in the aveoli mentioned are masses of embryonal connective cells, some with oval and some with round nuclei. In such masses there is very little unicellular substance. In some areas, when the mass of spindle-cells are cut parallel with the long diameter of their nuclei, an occasional rod-shaped nucleus is seen among the oval ones.

There are numbers of bloodvessels, some lying in the fibrous bundles, and have enormously thickened walls, others in the sarcomatous areas. These last sometimes have the absence of true walls characteristic to the growth, and others have the very much thickened walls, seen in other parts of the section. No trace of ovarian tissue is seen. The diagnosis is myo-fibrosarcoma of the ovary.

DISCUSSION.

DR. RIESMAN asked whether Dr. Steele, in view of the presence of unstriped muscle tissue, thought it possible that the tumor was primarily a liomyoma, and had afterward become sarcomatous. The combination of liomyoma and sarcoma had been described as occurring in the uterus, among others by Williams, of Baltimore, and by Marpurgo, and the name sarcoma myomatousum had been applied to them. Such tumors, it was conceivable, might arise in the ovary.

DR. STEELE: Dr. Riesman's question is an interesting one, and I imagine very difficult to decide. The traumatism mentioned in the history would appear to have some casual relation with the tumor, as the abdominal symptoms are definitely stated to have begun immediately after it occurred, and it is possible that the injury caused a previously existing myofibroma to undergo a sarcomatous transformation. Histologically, it is difficult to find appearances which could decide the question. *April 13, 1899.*

Aneurism of the Thoracic Aorta.

W. E. HUGHES, M.D.

J. E., aged sixty-three years, had had a constant cough for the past two years, especially marked in the winter. For several years before that there had been cough through much of the winter, but not in summer. There was some slight dyspnœa on severe exertion, with a little palpitation. Beyond these there were absolutely no thoracic symptoms till the end. I had made careful examinations of his chest and failed to find anything except a moderate degree of emphysema. The heart appeared quite normal. He had frequent micturition and a deal of bladder distress, due evidently to an enlarged prostate. The urine contained occasionally a mere trace of albumin, but never any casts. In addition there were distinct ataxic symptoms of a moderate degree of advancement. The gait was characteristic. The knee-jerks were lost; there was some anæsthesia of the lower extremities, and he had rather frequent attacks of most excruciating pains through the thighs and legs. The pains were the most prominent symptoms, and they had existed for about five years. The loss of co-ordination of the lower extremities and the abolition of knee-jerk had been present when I first saw him, two years before his death, but he thought there had been some difficulty in his walking for possibly a year previous. At length, after an excessively severe spell of coughing, there was sudden collapse, with most urgent dyspnœa. When I saw him the next morning he had reacted from the collapse, but breathing was still labored,

and swallowing was almost impossible. He complained of moderate pain and a sensation of a lump in the upper part of the chest. Just to the left of the sternum on the first and second costal cartilages was a very evident area of distress. There was some amelioration in his symptoms during the next three days, at the end of which time, in another paroxysm of coughing, he collapsed and died. He had never had syphilis, and his habits had been fairly regular and temperate.

At the autopsy an aneurism of the aorta was found, beginning at the lower part of the arch and extending about half way down through the thoracic aorta. This aneurism had eroded extensively and deeply the left antero-lateral faces of the bodies of the third, fourth, and fifth thoracic vertebræ, but not deep enough to actually encroach upon the spinal canal. The aneurism had ruptured, probably during the coughing spell, and the blood had escaped into the mediastinal cellular tissue in front of and around the sac, producing the tumor, recognized just before death. The remainder of the aorta was somewhat atheromatous. The aortic and mitral valves were thickened, but competent. The heart muscle was normal in appearance, and was not hypertrophied. The lungs were somewhat emphysematous, and the bronchial mucous membranes were congested. The kidneys were somewhat granular, the urinary bladder dilated, and the prostate gland enlarged. It was not possible to examine the brain or spinal cord.

The case was interesting from the absence of symptoms, even in spite of the extensive bone erosion; also from the association of locomotor ataxia. It is probable that this was an accidental association, though the possibility remains that the cord lesion may have been the direct result of the irritation by the aneurism.

April 13, 1899.

Septic Peritonitis Following Inflammation of the Uterus Consequent on Cancer.

W. E. HUGHES, M.D.

The immediate cause of death was a septic peritonitis of recent origin, the abdomen being filled with pus, and the coils of intes-

tines covered and glued together with yellow, friable lymph. The pus and lymph were most in evidence as the pelvis was approached. The uterus was much enlarged and flabby. On its left lateral surface was an irregular area about two inches in diameter, where the wall was gangrenous, very thin, and in places had actually given way. On the inner surface of the uterus were several areas of yellow lymph. The mucous membrane in general was congested and thrown into irregular areas of prominence, in places almost polypoid. In the lower part of the rectum was an extensive cancer, involving the vagina and part of the cervix of the uterus. This cancer tissue was sloughing extensively. There was no cancer in the body of the uterus. The specimens were removed from the body of a woman, aged seventy-two years, who had, for about two years, had symptoms of cancer of the rectum. She developed suddenly a peritonitis, and died after a few days illness.

Before the autopsy it was thought that the peritonitis was due to direct infection from the rectum, but the true march of events was probably as follows: The cancer had occluded the uterine os, and by irritation had caused hypersecretion from the uterine mucous membrane, and distention. Then breaking down of the cancer mass had introduced into the uterus infecting germs from the rectum, with consequent septic inflammation, local destruction of the uterine wall, and general peritonitis. As the body had been embalmed it was impossible to make a culture from the peritoneum.

April 13, 1899.

Colloid Carcinoma of the Stomach, Peritoneum, and Liver.

ALFRED STENGEL, M.D.

A. B., male, aged fifty-five years, was admitted to the University Hospital suffering with great dyspnœa and swelling of the feet. There was a distinct mass in the epigastrium and right hypochondriac region. The patient had suffered with no gastric symptoms, and no enlargement of the stomach could be determined. The abdominal mass clearly involved the liver, but, in addition,

extended across the abdomen in a way suggesting that the stomach was implicated. There was marked cachexia, and on examination of the blood a decided leucocytosis (22,000 per c.mm.) was discovered with especial increase of the polymorphonuclear elements. On examination of the thorax there was found an area of flatness extending upward from the liver dulness toward the right clavicle as high as the second rib, and outward from the right border of the sternum as far as the anterior axillary line. Over this area the heart-sounds were clear and rather metallic in character; but breath sounds could not be heard and vocal fremitus was absent. The patient presented considerable swelling of the feet and some ascites. The dyspnoea increased; Cheyne-Stokes breathing became marked, and the patient died.

The specimens which I show you were removed twenty-four hours after death. The stomach, as you see, is uniformly thickened; the walls of gelatinous character and the mesenteric reflections infiltrated by direct extension of the process from the stomach. The pylorus is normal in calibre, and the stomach is smaller than normal in capacity. The mass which had been found, clinically, running across the epigastric region is seen to be the infiltrated and contracted mesentery. The liver contains a number of nodules, varying in size from that of a pea to that of a walnut. On section, these are found to be decidedly gelatinous in the centre. The peritoneum is extensively involved, in the upper portion of the abdomen, by a direct infiltrating growth of the same gelatinous character as that of the stomach and liver. The growth has also penetrated the diaphragm and involved on the right side the pleura and pericardium. There is an anterior sacculated pleural effusion on the right side.

Microscopically the growth is a gelatinous carcinoma, showing myxomatous degeneration of the connective-tissue of the new growth.

March 23, 1899.